Church's Reception of Turing's 1936 Paper

a Philosophical Angle

Edgar G. Daylight
egdaylight@dijkstrascry.com

Siegen University
&
Lille University

Zürich HaPoC
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Turing’36

Church’37

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Turing's Human Computer (*not his* analysis)

(1) behaviorist psychology

(2) & (3) step-by-step account

Turing's Human Computer (*not his* analysis)

(1)	behaviorist psychology		[empirical]
(2) & (3)	step-by-step account		[mathematical]
	(2)	propositional language	[non causal]
	(3)	performative language	[causal]

Turing’s Human Computer (*not his* analysis)

(1)	behaviorist psychology		[empirical]
(2) & (3)	step-by-step account		[mathematical]
	(2)	propositional language	[non causal]
	(3)	performative language	[causal]

All of this is mathematical for an idealist, i.e., for Turing

Turing's Human Computer (*not his* analysis)

(1)	What human computers accomplish as a result	
(2) & (3)	step-by-step account	[mathematical]
	(2) propositional language	[non causal]
	(3) performative language	[causal]

Turing's Human Computer (*not his* analysis)

(1) What human computers accomplish as a result

(2) & (3) step-by-step account [mathematical]

(2) What they *are* doing *when* they compute

(3) What they *are* supposed (or commanded) to do *when* they compute

Turing’s Human Computer (*not his* analysis)

(1) What human computers accomplish as a result

(2) & (3) step-by-step account [mathematical]

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(1) <-> (2) [Schüttpelz 2020, private correspondence]

(1) <-> (3) [Hodges 1983, footnote on p.107]

from Human to Machine (*not his* analysis)

We may now construct a machine to do the work of this computer. To each state of mind of the computer corresponds an "*m*-configuration" of the machine…

[Turing 1936, p.251]

Turing … inconspicuously … slipped into describing 'a machine to do the work of this computer' *in exactly the same language* that was earlier used to characterize the operations of the human computer …

[Schmidt 2011, p.401]

from Human to Machine (*not his* analysis)

[Shanker 1987, p.637]

[Schmidt 2011, p.402]

from Human to Machine (*not his* analysis)

[The] shift from *encoding* to *embodying* marks a categorical departure to causal domains from which there can be no return to normativity

[Shanker 1987, p.637]

… whoever does the calculation understands the rules of the calculus in question

… the calculator has the ability to apply the rules and can justify the procedure and the result with reference to the rules

[Schmidt 2011, p.402]

from Human to Machine (*not his* analysis)

Turing was guilty … either of

- the illicit assumption that the concept of *following a rule* can be regarded as a cybernetic mechanism
- of presenting the steps of a Turing machine program in completely misleading form

[Shanker 1987, p.638]

from Human to Machine (*not his* analysis)

Turing [and computer science at large] are flickering between

- the *normative concept* of following a rule
- the *causal concept* of machinery

[Schmidt 2011, p.408]

Turing ⟷ Schmidt

Shanker

idealism *dualism*

Turing



Newman





Church

Turing



idealism

dualism





instrumentalism

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Church … at least until 1937

- Denying the reality of mathematical & logical entities
- Espousing a kind of instrumentalism or fictionalism
- Mathematical entities [Turing’s machines] are
  - ❑ fictions,
  - ❑ part of an abstract structure constructed by us to enable us to understand reality



instrumentalism

[Anderson 1998, p.137-38]

Church's 1937 comments

… it shall be possible to devise a computing machine, occupying a finite space and with working parts of finite size, which will write down the sequence to any desired number of terms if …



instrumentalism

Turing



dualism





instrumentalism

Turing

dualism







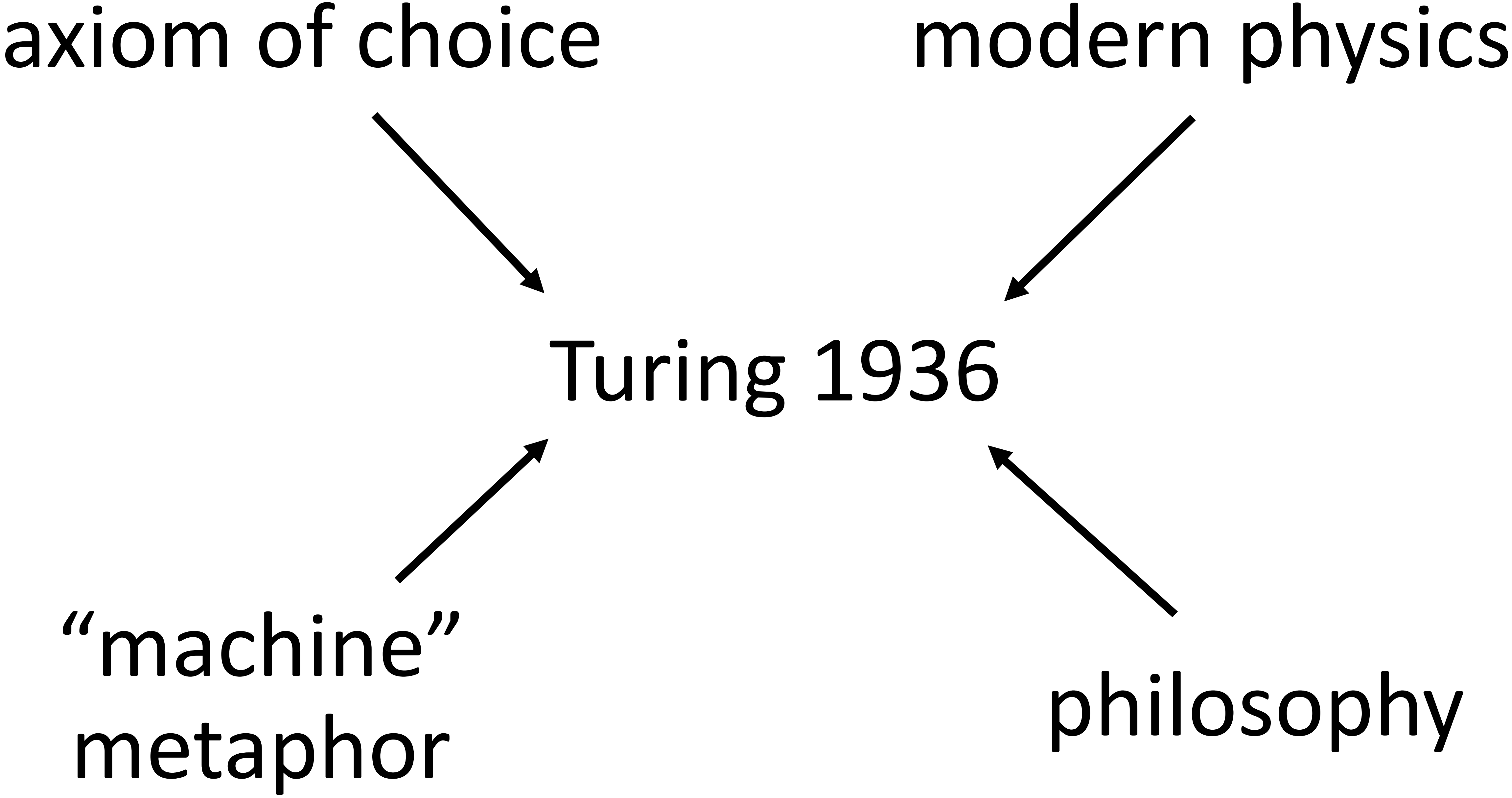


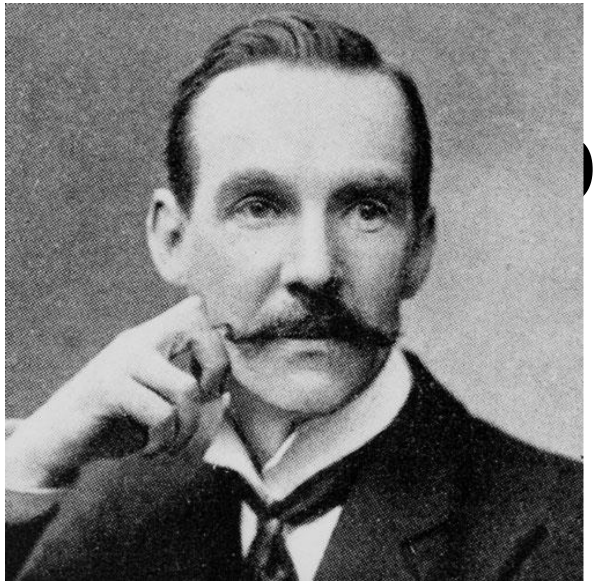
Everything is mathematical

Nothing is mathematical

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axiom of choice
modern physics
Turing 1936
“machine”
metaphor
philosophy



of choice

modern



Hobson

Turing 1936

Eddington



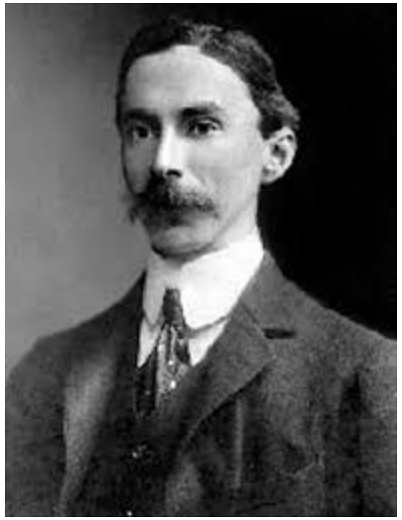




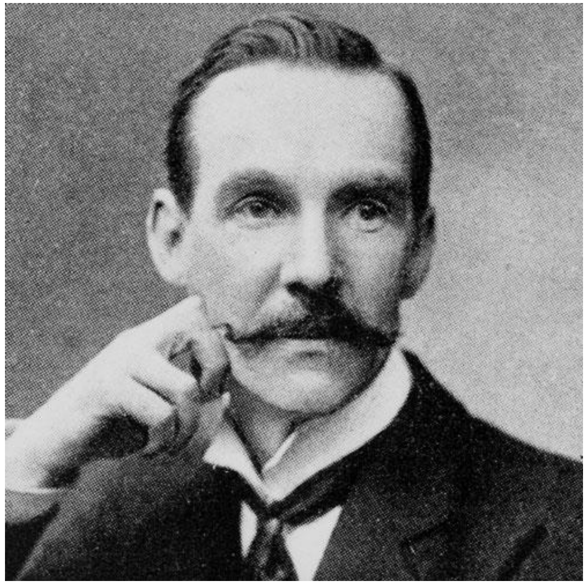




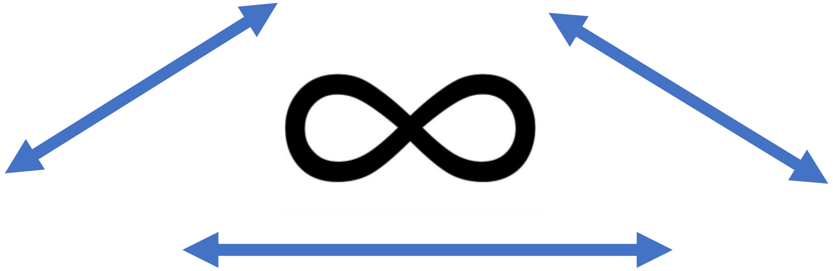




Russell



Hobson





Hardy

Describable in the symbolism of physics?





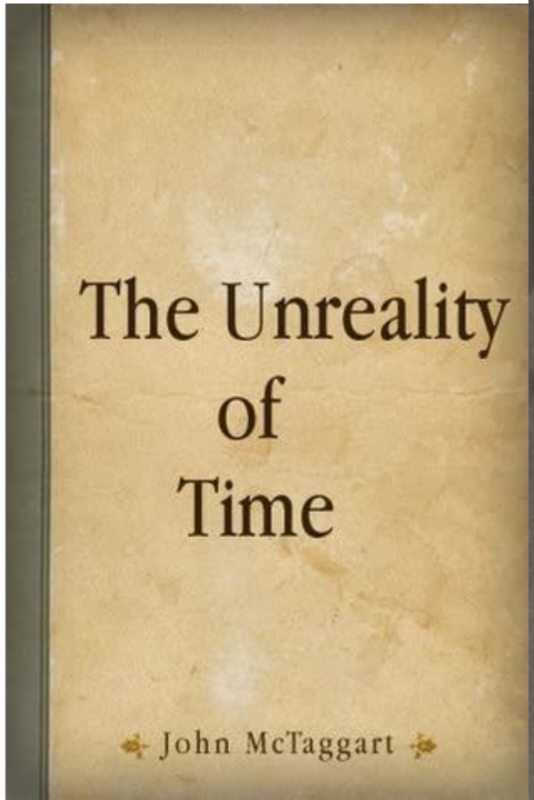
- Rainbow
- Humour

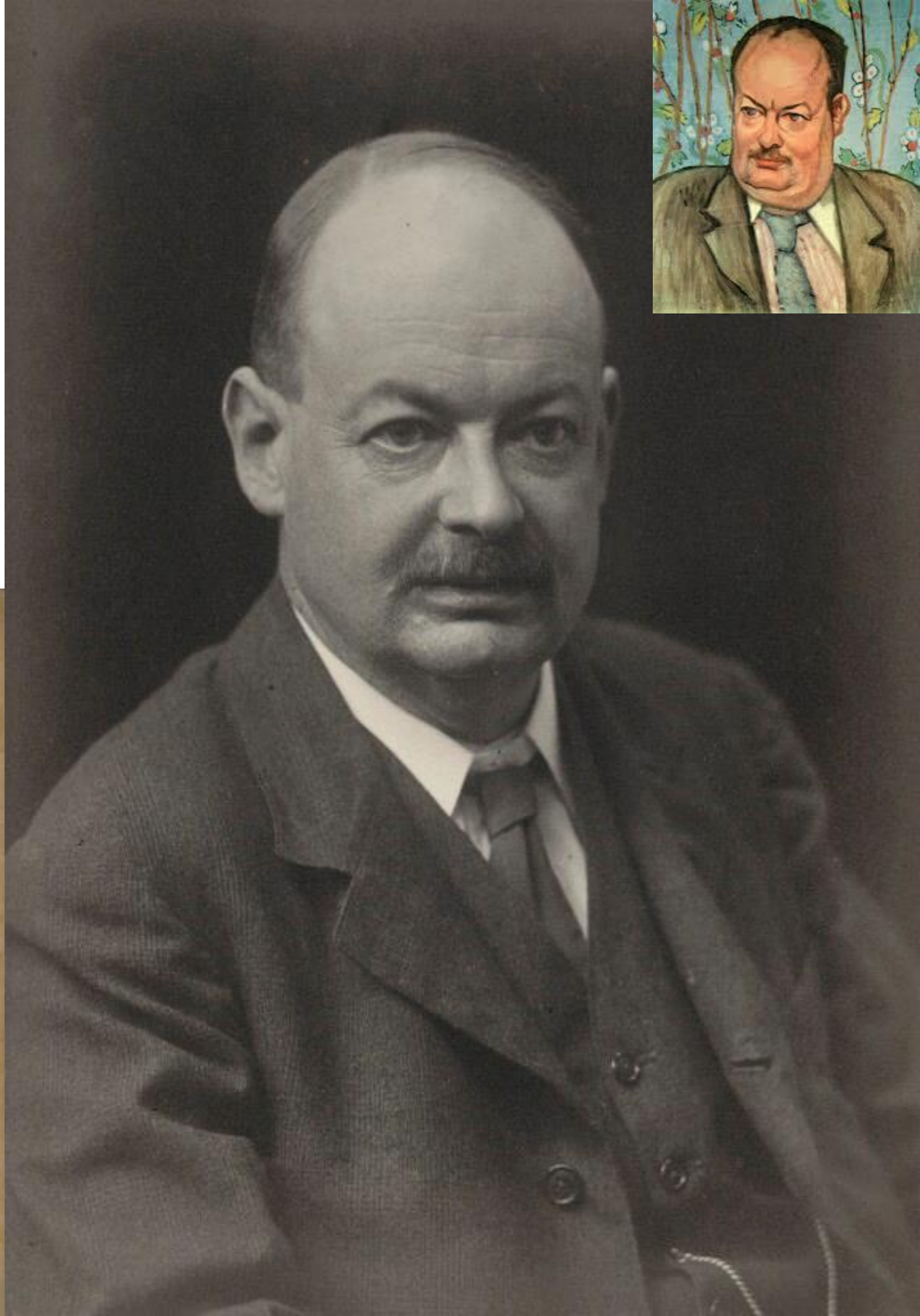
[Eddington 1928, p.322, 328]

J.M.E. McTaggart (1866-1925)

An *idealist* philosopher in the tradition of
- Hegel
- Bradley

The perception of changing time is an *illusion*







“Souls act according to the laws of final causes, through appetitions, ends, and means.

Bodies act according to the laws of efficient causes or of motions.

And these two kingdoms … are in harmony with each other.”

[SEP entry on Leibniz]

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Turing did not categorically distinguish
between
a mathematical machine & a physical machine

What, then, did Turing take to be a
`Turing machine' in 1937, in 1948?


Thank you

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